The earlier volumes of Silliman's Journal contain important contributions to mineralogy from his pen. Mineralogy is so intimately related to chemistry that he retained through life a lively interest in this department of science.

Those who have regarded Dr. Torrey as a botanist only, will be surprised to know that the avocation of his life was that of a chemist, and that the works that have made him an undying name in science were done in what he regarded as his hours of recreation.

During the last years of his life he held the position of Assayer in the U. S. Assay office in New York, and this connection with the Treasury Department had one happy result. Although he had done so much in describing and naming the plants of the far west, he had traveled but little: he "had never seen a prairie," as he was once heard to say with a tone of sadness, and had never ascended a mountain higher than Mt. Marcy. It was a graceful act of the Secretary of the Treasury to send him in 1865 upon a confidential mission to California. He went by the way of the Isthmus and was able to see and enjoy the luxuriant vegetation of the tropics, and, when he reached his destination, was met by an order to make some extended explorations, for the accomplishment of which a revenue cutter was placed at his command. While in California he was able to see many of the plants he had described growing in their native localities, and to make considerable collections for the herbarium.

In 1872 he made another journey to California, this time by railroad. Upon his return journey he tarried awhile among the Rocky Mountains and ascended Torrey's Peak, which was several years before thus named by his former pupil, Dr. Parry. It is pleasant to think of him as passing the last days of his botanizing, in the evening of his life, among the alpine plants which in his youth he first made known to the botanical world.

Neither this last journey to California nor one made the previous winter to Florida served to arrest the disease which those who saw him only at intervals could perceive was gradually wasting his body, though it did not dim his intellect or impair his cheerfulness. At sunset on the tenth of March, 1873, he peacefully went to his rest.

Some Notes from Freshmen.

Professor W. J. Beal, of the Agricultural College, Lansing, Michigan, has just sent to us a few notes taken from the theses of his Freshmen. During a term of 12 weeks, when they begin daily lessons, each one writes a thesis on topics like those given below. A few hints are given directing the student how to proceed. After

making his observations, experiments, and notes, each student, usually alone with the teacher, gives the main points for his thesis. He may make additions before writing out the whole. These are read before the class and credit is given for the work. Of course more advanced students perform higher work.

What we need is just such information as is contained in this set of notes, and information as to methods in all of our botanical laboratories would be of great service to those of us who teach, for we must keep comparing notes in order to arrive at the most improved methods of training pupils. The notes from some of the theses of Dr. Beal's Freshmen are as follows:

THE TENDRILS OF VIRGINIA CREEPER.—J. A. DART tied weights to two old tendrils and found one sustained six pounds, another six and one-half pounds. A common sized tendril sustained five pounds. They were fastened to a high board fence. On a brick wall two large tendrils held five and six pounds respectively. The main stem of a vine six feet long contained twenty-five tendrils another contained twenty. One branch three feet long had twelve tendrils and supported 35 pounds. Some main vines have no tendrils, and the branches but few. There is quite a difference in vines about the number of tendrils and their capacity to stick to objects.

FERTILIZATION OF CATALPA SPECIOSA, WARDER.—E. S. ANTISDALE studied insects on the flowers of *Catalpa speciosa*. The flowers are too large for fertilization by honey bees or small humble bees. Their backs will not reach high enough to touch the stigmas and anthers. A large humble bee touches stigmas and anthers going in and out of a flower. The broad stigmas, before noticed by others, are sensitive and close in a few seconds after they are touched, close before a bee backs out of the flower. He covered up several panicles of flowers with mosquito netting. No bees were placed inside of two of these. Small humble bees were placed in a third sack containing flowers on which the bees were seen to work. No fruit set on any of these three. In the fourth net large humble bees were placed, but they failed to work on the flowers, and no fruit set in this case. In several flowers not covered with netting he saw a large humble bee working and watched it as the back was dusted with pollen and the stigmas closed. He marked three of these flowers, two of which set fruit.

ÆSTIVATION OF FUCHSIAS.—R. C. WILLIAMS examined the æstivation of 65 flowers of cultivated Fuchsias and made diagrams of all the forms. The sepals were all valvate. The petals were arranged in 45 different ways, several variations of the convolute prevailing. Some were reduplicate in whole or in part.

INSECTS CAUGHT BY APOCYNUM.—H. T. FRENCH examined insects about *Apocynum androsæmifolium* where they went for pollen and nectar. They are often caught while backing out of the bell-shaped flower. There are five wedge-shaped grooves made by the filaments—the larger part of the groove is at the base of the

corolla. One fly twisted his head off in the attempt to get away. Many small bees got caught, and mosquitoes too, quite often two to a flower. They are held by the tongue or the legs. Honey bees are large enough to escape or pull out. He could not discover that the capturing of flies or bees was of any advantage to the plant.

How the Seeds of Stipa are Planted by Nature.—Jesse J. Beal dropped about 20 fruits of *Stipa spartea* on a box of sand. The fruit has a long awn which is straight when wet and twisted when dry. Half the grains were dropped on sand where straws were stuck in every inch or so in every direction, the other half were dropped on sand without any straws or other objects on the surface. The grains were each held by the tip of the awn about as high as the plant grows, and each went down like an arrow, large end first, and all stuck in the sand but one. They were alternately wet and dried by sun and rain. They all bored into the sand except one. They went down just as well where there were no straws as where there were straws.

Flowering of Timothy.—E. C. Bank observed in cool damp weather, beginning June 29th, that a spike of timothy (*Phleum pratense*) put forth flowers (stamens) for ten days in succession, except none on the ninth day. In another place, in warmer weather, beginning July 15th, spikes put forth stamens for eleven days. Most flowers appear during a few days of the middle of these periods.

The Climbing of the Wild Morning Glory.—E. T. Gardner observed the wild morning glory (*Calystegia sepium*) and as in former years some dozen specimens were found twining the wrong way, following the course of the sun. A smooth post two inches in diameter was about as large as the vine would ascend.

Structure and Growth of the Cell Wall.

Prof. E. Strasburger's most recent publication is a work of 264 pp. entitled, "Ueber den Bau und das Wachsthum der Zellhaute" (On the Structure and Growth of the Cell-Wall). The book contains some most interesting contributions to our knowledge of the origin and growth of the cell-wall and starch grains, the function of the nucleus and the assimilation of carbon, and, based upon our previous knowledge and the author's investigations, offers some important theories in regard to the molecular structure of organized bodies.

So worthy of notice are some of the results at which he has arrived that we reproduce from the *Jour. Roy. Mic. Soc.* a summary of the salient points of the book, as follows:

With regard to the intimate structure of organized bodies,